

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

* * * * *

PRELIMINARY AMENDMENT

IN THE CLAIMS

4. (Amended) The CHO cell according to claim 1, wherein the activity of an enzyme relating to the synthesis of an intracellular sugar nucleotide, GDP-fucose and/or the activity of an enzyme relating to the modification of a sugar chain in which fucose is

08 FC:128 1648.00 CH 312.00 OP

bound to 6-position of *N*-acetylglucosamine in the reducing end through $\alpha(1\rightarrow6)$ glycosyl bond in the complex *N*-glycoside-linked sugar chain is decreased or deleted.

12. (Amended) The CHO cell according to claim 4, wherein the enzyme relating to the modification of a sugar chain in which fucose is bound to 6-position of the *N*-acetylglucosamine in the reducing end through $\alpha(1\rightarrow6)$ glycosyl bond in the complex *N*-glycoside-linked sugar chain is α -1,6-fucosyltransferase.

15. (Amended) The CHO cell according to claim 4, wherein the enzyme activity is decreased or deleted by a technique selected from the group consisting of the following (a), (b), (c), (d) and (e):

- (a) a gene disruption technique targeting a gene encoding the enzyme;
- (b) a technique for introducing a dominant negative mutant of a gene encoding the enzyme;
- (c) a technique for introducing mutation into the enzyme;
- (d) a technique for inhibiting transcription and/or translation of a gene encoding the enzyme;
- (e) a technique for selecting a cell line resistant to a lectin which recognizes a sugar chain in which fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through $\alpha(1\rightarrow6)$ glycosyl bond in the complex *N*-glycoside-linked sugar chain.

16. (Amended) The CHO cell according to claim 4, which is resistant to at least a lectin which recognizes a sugar chain in which fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through $\alpha(1\rightarrow6)$ glycosyl bond in the complex *N*-glycoside-linked sugar chain.

17. (Amended) The CHO cell according to claim 4, which produces an antibody composition having higher antibody-dependent cell-mediated cytotoxic activity than an antibody composition produced by its parent CHO cell.

19. (Amended) The CHO cell according to claim 18, wherein the sugar chain to which fucose is not bound is a complex *N*-glycoside-linked sugar chain in which fucose is not bound to 6-position of *N*-acetylglucosamine in the reducing end through $\alpha(1\rightarrow6)$ glycosyl bond.

20. (Amended) A method for producing an antibody composition, which comprises culturing the CHO cell according to claim 1 in a medium to produce and accumulate an antibody composition in the culture; and recovering the antibody composition from the culture.

23. (Amended) A cell in which the activity of an enzyme relating to the synthesis of an intracellular sugar nucleotide, GDP-fucose and/or the activity of an enzyme relating to the modification of a sugar chain wherein fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through $\alpha(1\rightarrow6)$ glycosyl bond in the complex *N*-glycoside-linked sugar chain is decreased or deleted by a genetic engineering technique.

31. (Amended) The cell according to claim 23, wherein the enzyme relating to the modification of a sugar chain in which fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through $\alpha(1\rightarrow6)$ glycosyl bond in the *N*-glycoside-linked sugar chain is α -1,6-fucosyltransferase.

34. (Amended) The cell according to claim 23, wherein the genetic engineering technique is a technique selected from the group consisting of the following (a), (b), (c) and (d):

- (a) a gene disruption technique targeting a gene encoding the enzyme;
- (b) a technique for introducing a dominant negative mutant of a gene encoding the enzyme;
- (c) a technique for introducing mutation into the enzyme;
- (d) a technique for inhibiting transcription and/or translation of a gene encoding the enzyme.

35. (Amended) The cell according to claim 23, which is resistant to at least a lectin which recognizes a sugar chain in which fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through $\alpha(1\rightarrow6)$ glycosyl bond in the *N*-glycoside-linked sugar chain.

36. (Amended) The cell according to claim 23, which is a cell selected from the group consisting of the following (a) to (i):

- (a) a CHO cell derived from a Chinese hamster ovary tissue;
- (b) a rat myeloma cell line, YB2/3HL.P2.G11.16Ag.20 cell;

- (c) a mouse myeloma cell line, NSO cell;
- (d) a mouse myeloma cell line, SP2/0-Ag14 cell;
- (e) a BHK cell derived from a syrian hamster kidney tissue;
- (f) an antibody-producing hybridoma cell;
- (g) a human leukemia cell line Namalwa cell;
- (h) an embryonic stem cell;
- (i) a fertilized egg cell.

37. (Amended) The cell according to claim 23 into which a gene encoding an antibody molecule is introduced.

39. (Amended) A method for producing an antibody composition, which comprises culturing the cell according to claim 37 in a medium to produce and accumulate the antibody composition in the culture; and recovering the antibody composition from the culture.

41. (Amended) An antibody composition which is produced using the method according to claim 39.

42. (Amended) A transgenic non-human animal or plant or the progenies thereof, comprising a genome which is modified such that the activity of an enzyme relating to the synthesis of an intracellular sugar nucleotide, GDP-fucose and/or the activity of an enzyme relating to the modification of a sugar chain in which fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through $\alpha(1\rightarrow6)$ glycosyl bond in the *N*-glycoside-linked sugar chain is decreased.

43. (Amended) The transgenic non-human animal or plant or the progenies thereof according to claim 42, wherein a gene encoding the enzyme relating to the synthesis of an intracellular sugar nucleotide, GDP-fucose or a gene encoding the enzyme relating to the modification of a sugar chain in which fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through $\alpha(1\rightarrow6)$ glycosyl bond in the *N*-glycoside-linked sugar chain is knocked out.

44. (Amended) The transgenic non-human animal or plant or the progenies thereof according to claim 42, wherein the enzyme relating to the synthesis of an

intracellular sugar nucleotide, GDP-fucose is an enzyme selected from the group consisting of the following (a), (b) and (c):

- (a) GMD (GDP-mannose 4,6-dehydratase);
- (b) Fx (GDP-keto-6-deoxymannose 3,5-epimerase, 4-reductase);
- (c) GFPP (GDP-beta-L-fucose pyrophosphorylase).

48. (Amended) The transgenic non-human animal or plant or the progenies thereof according to claim 42, wherein the enzyme relating to the modification of a sugar chain in which fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through $\alpha(1\rightarrow6)$ glycosyl bond in the *N*-glycoside-linked sugar chain is α -1,6-fucosyltransferase.

50. (Amended) The transgenic non-human animal or plant or the progenies thereof according to claim 42, wherein the transgenic non-human animal is an animal selected from the group consisting of cattle, sheep, goat, pig, horse, mouse, rat, fowl, monkey and rabbit.

51. (Amended) A method for producing an antibody composition, which comprises introducing a gene encoding an antibody molecule into the transgenic non-human animal or plant or the progenies thereof according to claim 42; rearing the animal or plant; isolating tissue or body fluid comprising the introduced antibody composition from the reared animal or plant; and recovering the antibody composition from the isolated tissue or body fluid.

53. (Amended) The method according to claim 51, which produces an antibody composition having higher antibody-dependent cell-mediated cytotoxic activity than an antibody composition obtained from a non-human animal or plant or the progenies thereof whose genome is not modified.

54. (Amended) An antibody composition which is produced using the method according to claim 51.

KANDA et al
Serial No. 09/971,773

REMARKS

The claims have been amended to reduce the filing fees, without prejudice.

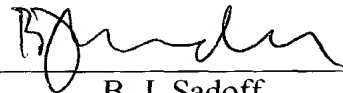
An English translation of the U.S. provisional priority application Serial No. 60/268,916 has been filed Monday, June 17, 2002 with a Declaration of Mr. Eiichi Kobayashi regarding the accuracy of the translation and a Submission.

An early and favorable Action on the merits is requested.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: _____



B. J. Sadoff
Reg. No. 36,663

BJS:plb
1100 North Glebe Road, 8th Floor
Arlington, VA 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

2. (Amended) The CHO cell according to claim 1, wherein the sugar chain to which fucose is not bound is a complex *N*-glycoside-linked sugar chain in which [1-position of] fucose is not bound to 6-position of *N*-acetylglucosamine in the reducing end through [α -bond] $\alpha(1\rightarrow6)$ glycosyl bond.

3. (Amended) The CHO cell according to claim 1 [or 2], wherein the antibody molecule belongs to an IgG class.

4. (Amended) The CHO cell according to [any one of] claim[s] 1 [to 3], wherein the activity of an enzyme relating to the synthesis of an intracellular sugar nucleotide, GDP-fucose and/or the activity of an enzyme relating to the modification of a sugar chain in which [1-position of] fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through [α -bond] $\alpha(1\rightarrow6)$ glycosyl bond in the complex *N*-glycoside-linked sugar chain is decreased or deleted.

12. (Amended) The CHO cell according to claim 4, wherein the enzyme relating to the modification of a sugar chain in which [1-position of] fucose is bound to 6-position of the *N*-acetylglucosamine in the reducing end through [α -bond] $\alpha(1\rightarrow6)$ glycosyl bond in the complex *N*-glycoside-linked sugar chain is α -1,6-fucosyltransferase.

15. (Amended) The CHO cell according to [any one of] claim[s] 4 [to 14], wherein the enzyme activity is decreased or deleted by a technique selected from the group consisting of the following (a), (b), (c), (d) and (e):

- (a) a gene disruption technique targeting a gene encoding the enzyme;
- (b) a technique for introducing a dominant negative mutant of a gene encoding the enzyme;
- (c) a technique for introducing mutation into the enzyme;
- (d) a technique for inhibiting transcription and/or translation of a gene encoding the enzyme;
- (e) a technique for selecting a cell line resistant to a lectin which recognizes a sugar chain in which [1-position of] fucose is bound to 6-position of *N*-acetylglucosamine

in the reducing end through [α -bond] $\alpha(1\rightarrow6)$ glycosyl bond in the complex *N*-glycoside-linked sugar chain.

16. (Amended) The CHO cell according to [any one of] claim[s] 4 [to 15], which is resistant to at least a lectin which recognizes a sugar chain in which [1-position of] fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through [α -bond] $\alpha(1\rightarrow6)$ glycosyl bond in the complex *N*-glycoside-linked sugar chain.

17. (Amended) The CHO cell according to [any one of] claim[s] 4 [to 16], which produces an antibody composition having higher antibody-dependent cell-mediated cytotoxic activity than an antibody composition produced by its parent CHO cell.

19. (Amended) The CHO cell according to claim 18, wherein the sugar chain to which fucose is not bound is a complex *N*-glycoside-linked sugar chain in which [1-position of] fucose is not bound to 6-position of *N*-acetylglucosamine in the reducing end through [α -bond] $\alpha(1\rightarrow6)$ glycosyl bond.

20. (Amended) A method for producing an antibody composition, which comprises culturing the CHO cell according to [any one of] claim[s] 1 [to 19] in a medium to produce and accumulate an antibody composition in the culture; and recovering the antibody composition from the culture.

23. (Amended) A cell in which the activity of an enzyme relating to the synthesis of an intracellular sugar nucleotide, GDP-fucose and/or the activity of an enzyme relating to the modification of a sugar chain wherein [1-position of] fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through [α -bond] $\alpha(1\rightarrow6)$ glycosyl bond in the complex *N*-glycoside-linked sugar chain is decreased or deleted by a genetic engineering technique.

31. (Amended) The cell according to claim 23, wherein the enzyme relating to the modification of a sugar chain in which [1-position of] fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through [α -bond] $\alpha(1\rightarrow6)$ glycosyl bond in the *N*-glycoside-linked sugar chain is α -1,6-fucosyltransferase.

34. (Amended) The cell according to [any one of] claim[s] 23 [to 33], wherein the genetic engineering technique is a technique selected from the group consisting of the following (a), (b), (c) and (d):

- (a) a gene disruption technique targeting a gene encoding the enzyme;
- (b) a technique for introducing a dominant negative mutant of a gene encoding the enzyme;
- (c) a technique for introducing mutation into the enzyme;
- (d) a technique for inhibiting transcription and/or translation of a gene encoding the enzyme.

35. (Amended) The cell according to [any one of] claim[s] 23 [to 34], which is resistant to at least a lectin which recognizes a sugar chain in which [1-position of] fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through [α -bond] $\alpha(1\rightarrow6)$ glycosyl bond in the *N*-glycoside-linked sugar chain.

36. (Amended) The cell according to [any one of] claim[s] 23 [to 35], which is a cell selected from the group consisting of the following (a) to (i):

- (a) a CHO cell derived from a Chinese hamster ovary tissue;
- (b) a rat myeloma cell line, YB2/3HL.P2.G11.16Ag.20 cell;
- (c) a mouse myeloma cell line, NSO cell;
- (d) a mouse myeloma cell line, SP2/0-Ag14 cell;
- (e) a BHK cell derived from a syrian hamster kidney tissue;
- (f) an antibody-producing hybridoma cell;
- (g) a human leukemia cell line Namalwa cell;
- (h) an embryonic stem cell;
- (i) a fertilized egg cell.

37. (Amended) The cell according to [any one of] claim[s] 23 [to 36] into which a gene encoding an antibody molecule is introduced.

39. (Amended) A method for producing an antibody composition, which comprises culturing the cell according to claim 37 [or 38] in a medium to produce and accumulate the antibody composition in the culture; and recovering the antibody composition from the culture.

41. (Amended) An antibody composition which is produced using the method according to claim 39 [or 40].

42. (Amended) A transgenic non-human animal or plant or the progenies thereof, comprising a genome which is modified such that the activity of an enzyme relating to the synthesis of an intracellular sugar nucleotide, GDP-fucose and/or the activity of an enzyme relating to the modification of a sugar chain in which [1-position of] fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through [α -bond] $\alpha(1\rightarrow6)$ glycosyl bond in the *N*-glycoside-linked sugar chain is decreased.

43. (Amended) The transgenic non-human animal or plant or the progenies thereof according to claim 42, wherein a gene encoding the enzyme relating to the synthesis of an intracellular sugar nucleotide, GDP-fucose or a gene encoding the enzyme relating to the modification of a sugar chain in which [1-position of] fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through [α -bond] $\alpha(1\rightarrow6)$ glycosyl bond in the *N*-glycoside-linked sugar chain is knocked out.

44. (Amended) The transgenic non-human animal or plant or the progenies thereof according to claim 42 [or 43], wherein the enzyme relating to the synthesis of an intracellular sugar nucleotide, GDP-fucose is an enzyme selected from the group consisting of the following (a), (b) and (c):

- (a) GMD (GDP-mannose 4,6-dehydratase);
- (b) Fx (GDP-keto-6-deoxymannose 3,5-epimerase, 4-reductase);
- (c) GFPP (GDP-beta-L-fucose pyrophosphorylase).

48. (Amended) The transgenic non-human animal or plant or the progenies thereof according to claim 42 [or 43], wherein the enzyme relating to the modification of a sugar chain in which [1-position of] fucose is bound to 6-position of *N*-acetylglucosamine in the reducing end through [α -bond] $\alpha(1\rightarrow6)$ glycosyl bond in the *N*-glycoside-linked sugar chain is α -1,6-fucosyltransferase.

50. (Amended) The transgenic non-human animal or plant or the progenies thereof according to [any one of] claim[s] 42 [to 49], wherein the transgenic non-human animal is an animal selected from the group consisting of cattle, sheep, goat, pig, horse, mouse, rat, fowl, monkey and rabbit.

KANDA et al
Serial No. 09/971,773

51. (Amended) A method for producing an antibody composition, which comprises introducing a gene encoding an antibody molecule into the transgenic non-human animal or plant or the progenies thereof according to [any one of] claim[s] 42 [to 50]; rearing the animal or plant; isolating tissue or body fluid comprising the introduced antibody composition from the reared animal or plant; and recovering the antibody composition from the isolated tissue or body fluid.

53. (Amended) The method according to claim 51 [or 52], which produces an antibody composition having higher antibody-dependent cell-mediated cytotoxic activity than an antibody composition obtained from a non-human animal or plant or the progenies thereof whose genome is not modified.

54. (Amended) An antibody composition which is produced using the method according to [any one of] claim[s] 51 [to 53].